

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING  
**DEPARTMENT OF ARCHITECTURE**  
BACHELOR OF ARCHITECTURAL STUDIES (HONOURS) DEGREE  
PART II FIRST SEMESTER EXAMINATIONS – DECEMBER 2004  
**AAR 2104 – ENVIRONMENTAL DESIGN I**

Instructions:

Time: 3 Hours

*Answer Question 1 and three other questions only*

**QUESTION 1**

On the attached sheet are five climate graphs, for cities in each of five main climate zones, in your answer book, using the letters under each graph, answer the following questions:

- i) What climate zone does each climate graph represent? [5]
- ii) What are the principal climatic characteristics of the city as evident from the climate graph? [20]

**QUESTION 2**

- a) What is meant by orientation of a building and how can it influence the indoor thermal environment? [5]
- b) Describe the characteristics of an urban area that are instrumental in causing deviation from the localised macro-climate. [20]

**QUESTION 3**

What is thermal comfort? How can this be maintained in buildings designed for Zimbabwean cities? [25]

**QUESTION 4**

Discuss, with sketches, the four (4) major factors that influence the micro-climate of a site: sun motion, topography, surface characteristics, and physical structures. Comment on the micro-climate of Bulawayo, Zimbabwe, in relation to these four factors. [25]

**QUESTION 5**

The choice of building materials, especially for the external building envelope, greatly affects the flow of heat into buildings. Describe the thermo physical properties of building materials that are important to their thermal performance in buildings. Discuss the significance of climate in relation to the correct use of building materials in Zimbabwe. [25]

**QUESTION 6**

What are the principal functions of ventilation? In what ways can architect ensure sufficient ventilation to all parts of a building and at the same time keep out rain, dust and excessive solar radiation? [25]

ENVIRONMENTAL DESIGN - AAR 2104 - QUESTION!

